

A NEW FIND OF METEORIC STONES NEAR PLAINVIEW, HALE COUNTY, TEXAS.

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The stones described below were forwarded to the Museum by Mr. Harl Rightmire, who reports that they were found some 5 miles southwest of Plainview, in Hale County, Texas. Nothing is known regarding the fall, and as the various individuals show unmistakable evidences of having lain a long time in the soil, speculation is useless.

Three fairly complete individuals and a fragment were forwarded, weighing respectively 870 (fragment), 1320, 1,915, and 3,450 grams. Small fragments broken from two of the individuals are estimated to have weighed about 50 grams, bringing the total weight up to 7,605 grams. Inasmuch as the largest individual is plainly a spawl from a still larger mass, such figures are of little value excepting to the dealer and collector. Two of the more complete individuals, the first and third in size, are shown on plate 34, the larger being about 17 by 16½ by 7½ cm. in diameter. All are well encrusted, though discolored by oxidation. (See Addendum, p. 421.)

The fact that the pieces are obviously fragments from a large mass, and that Hale County abuts directly on Crosby County, led at first to the prompt suggestion that they might have belonged to the Estacado fall. A single glance at a thin section is enough, however, to show this to be incorrect, as the stones are of quite different types.

The smaller of the Plainview stones are too much oxidized to render exterior markings of much value, but apparently the face of the largest mass shown in figure 2 was the *brustseite*, as distinct radiations may be seen extending outward in all directions from the thumb pittings shown in the upper center (see pl. 34).

In thin section this meteorite is found to be of a common chondritic type, consisting of chondrules and fragments of chondrules in a finer ground in part crystalline and in part fragmental of the same mate-

rial interspersed with the usual metallic iron and abundant iron sulphide. The silicate minerals are olivine and pyroxenes of both the normal orthorhombic and twinned monoclinic types. No feldspars are present. Oxidation has badly obscured the finer details of structure and rendered impossible the identification of any minor constituents which might perhaps exist. The pulverized material boiled in water for half an hour gave a filtrate reacting distinctly for chlorine, calcium, and sulphur, and a portion allowed to stand for a like length of time in one part nitric acid and 20 parts water, gave strong qualitative reactions for P_2O_5 , CaO, and Fe_2O_3 . A complete analysis by Dr. J. E. Whitfield yielded:

| | Per cent. |
|------------------------|-----------|
| Metal..... | 6.22 |
| Metallic sulphide..... | 9.57 |
| Silicates..... | 84.21 |
| Total..... | 100.00 |

The metallic portion yielded:

| | |
|-----------------|--------|
| Iron..... | 90.63 |
| Nickel..... | 8.85 |
| Cobalt..... | .38 |
| Phosphorus..... | .14 |
| Total..... | 100.00 |

The silicate portion yielded:

| | |
|----------------------------------|-------|
| Silica (SiO_2)..... | 41.45 |
| Ferric oxide (Fe_2O_3)..... | 3.46 |
| Chromic oxide (Cr_2O_3)..... | .40 |
| Alumina (Al_2O_3)..... | 3.17 |
| Ferrous oxide (FeO)..... | 17.77 |
| Manganous oxide (MnO)..... | .21 |
| Lime (CaO)..... | 1.68 |
| Magnesia (MgO)..... | 28.99 |
| Nickel oxide (NiO)..... | .91 |
| Cobalt oxide (CoO)..... | .04 |
| Soda (Na_2O)..... | .90 |
| Potash (K_2O)..... | .14 |
| Total..... | 99.12 |

A recalculation of these results gives the mass composition of the stone as follows:

Metallic portion:

| | |
|---------------------|------|
| Iron (Fe)..... | 5.64 |
| Nickel (Ni)..... | .55 |
| Cobalt (Co)..... | .02 |
| Phosphorus (P)..... | .01 |

Troilite:

| | |
|------------------|------|
| Iron (Fe)..... | 6.09 |
| Sulphur (S)..... | 3.48 |

Silicates:

| | |
|--|----------|
| Silica (SiO ₂)..... | 35.31 |
| Ferric oxide (Fe ₂ O ₃)..... | 2.95 |
| Chromic oxide (Cr ₂ O ₃)..... | .34 |
| Alumina (Al ₂ O ₃)..... | 2.70 |
| Ferrous oxide (FeO)..... | 15.13 |
| Manganous oxide (MnO)..... | .18 |
| Lime (CaO)..... | 1.43 |
| Magnesia (MgO)..... | 24.69 |
| Nickel oxide (NiO)..... | .77 |
| Cobalt oxide (CoO)..... | .003 |
| Soda (Na ₂ O)..... | .76 |
| Potash (K ₂ O)..... | .12 |
| Chlorine (Cl)..... | not det. |
| Total..... | 100.173 |

The phosphorus, although determined in the soluble metallic portions, is in part present as a phosphate, as already noted, the chromium is present as chromite, while the troilite is calculated from the 3.48 per cent of sulphur found.

The texture of the stone is firm and the chondrules in large part break with the matrix. The ground in the fresh, unoxidized portion is crystalline, though in places doubtfully fragmental. I have classed it provisionally as a spherical chondrite (Cc). It will be known as the Plainview meteorite. The second largest mass, weighing 1,915 grams, is in the collections of the Field Museum of Natural History, Chicago. (See Addendum below.)

EXPLANATION OF PLATES.

PLATE 34.

The Plainview, Texas, meteorites. Cat. No. 521.

FIG. 1. The 1,320-gram stone as received.

2. The largest single individual of the Plainview meteorites, weighing 3,450 grams. The view shows the *brustseite* with radiations extending outward in all directions from the large thumb markings in the upper central portion of the figure.

PLATE 35.

Plainview meteorites, second find.

No. 1, 863 grams; No. 2, 2,527 grams; No. 3, 2,940 grams; No. 4, 4,592 grams; and No. 5, 5,585 grams.

ADDENDUM.

Since the above was written five more stones have been received, which Mr. Rightmire reports as having been found 2 miles west of those first discovered. These, as shown on plate 35, weigh, respectively, 863, 2,527, 2,940, 4,592, and 5,585 grams. Of these, No. 4 is of principal interest, showing areas of primary incrustation only at a few points, as at the lower extremity of the figure. The remaining surfaces show secondary incrustations over more recent fractures. Numbers 2, 3, and 5 are fairly complete individuals, though showing also secondary crusts over limited areas. Thin sections prepared from several individuals were at first thought to present structural

details such as to warrant referring them to a separate fall, but further study has led to the belief that the stone is a breccia, though the structural variations may be in part due to weathering.

When the possibility of brecciation was realized, the smallest (870-gram) fragment of the first find was cut in halves and polished. The resultant surfaces showed a ground of about equal parts light gray, mainly oxidized to reddish, and darker gray more or less angular areas. Both portions are equally injected with small, but abundant points of metallic iron and iron sulphide. There are also occasional light-gray fragments, some 2 to 4 mm. in length, which are evidently pyroxenic. To the unaided eye both portions are chondritic, though this structure is much more pronounced in the dark areas. It was at first thought that this difference might be merely apparent and due to the obscuring of the structure in the lighter portions through oxidation. Further investigation has, however, shown that this conclusion will not hold. Under the microscope the lighter portion is chondritic and consists wholly of olivine and enstatite with the metallic iron and iron sulphide. None of the twin pyroxenes so characteristic of the dark portion, which was the material described in the first part of this paper, are present. Further than that, the chondrules in the light portion are almost wholly very light gray and nearly white, while those in the dark portions are in part of a dark-gray color, although there are white chondrules here also. By reflected light the polished surface shows a structure distinctly brecciated, and in one or two cases it is possible to trace the outlines of a fragment of the darker rock inclosed in the lighter gray, but in the majority of cases this is impossible, and the darker material is so commingled with the lighter that for a long time considerable uncertainty existed in the mind of the writer as to the true nature of the stone. Even now he confesses to not feeling fully satisfied, but until one of the larger masses of the new find can pass into the possession of the Museum and be sawn through the center, in the hopes of getting beyond the zone of oxidation, this is the best that can be done. The strongest argument in favor of the brecciated nature of the stone seems to lie in the presence of the polysynthetically twinned pyroxenes in the dark-gray chondrules and their absence in the lighter portions. In one instance the line of demarkation between the light and dark portions could be plainly traced in thin section, and the metallic sulphides were found elongated along this line to indicate that it had been an open cleft at the time of their deposition.

In a single instance, in a radiating enstatite chondrule, there was noted a few minute inclosures of a blue-green mineral the like of which the writer has never before seen in a meteorite, and the exact nature of which can not be determined. The particles show no good crystal outlines nor cleavages such as would enable one to determine their orientation, optic axes, or extinction angles, and, except that they belong apparently to some inclined system, nothing can be said. The mineral is scarcely transparent and but faintly dichroic in yellow-green colors. More than anything else that can be recalled, it resembles the green hornblende inclosures sometimes found in pyroxenes in the older basic igneous rocks. In all the thin sections thus far prepared the mineral occurs in but a single instance.

So far as now known the total number of individuals comprising the Plainview fall is nine (including the two fragments), and the total weight 24,112 grams.